

WHAT IS CLAIMED IS:

1. A reactor for growing epitaxial layers comprising:  
a reaction chamber including a passthrough opening for inserting and removing wafer carriers from said reaction chamber;  
a cylindrical shutter located inside said reaction chamber for selectively closing said passthrough opening, said cylindrical shutter being movable between a first position for closing said passthrough opening and a second position for opening said passthrough opening, wherein said cylindrical shutter includes an internal cavity adapted to receive a cooling fluid.
2. The reactor as claimed in claim 1, further comprising tubing connected with said internal cavity of said shutter for supplying said cooling fluid to said internal cavity.
3. The reactor as claimed in claim 2, wherein said tubing includes at least one inlet tube for introducing said cooling fluid into said internal cavity and at least one outlet tube for removing said cooling fluid from said internal cavity.
4. The reactor as claimed in claim 2, wherein said tubing includes two or more inlet tubes for introducing said cooling fluid into said internal cavity and two or more outlet tubes for removing said cooling fluid from said internal cavity.
5. The reactor as claimed in claim 2, wherein said tubing is connected with said shutter for moving simultaneously with said shutter between said first and second shutter positions.
6. The reactor as claimed in claim 1, wherein said reactor comprises stainless steel.
7. The reactor as claimed in claim 1, further comprising an injection flange secured to said reaction chamber for introducing reactants inside said reaction chamber.

8. The reactor as claimed in claim 1, further comprising one or more heating elements provided in communication with said reaction chamber for heating wafer carriers secured within said reaction chamber.

9. The reactor as claimed in claim 8, wherein said heating elements are provided inside said reaction chamber, said reactor further comprising one or more heat shields provided adjacent said one or more heating elements for directing heat from said heating elements toward said wafer carriers secured within said reaction chamber.

10. A reactor for growing epitaxial layers comprising:

a reaction chamber including a passthrough opening for inserting and removing wafer carriers from said reaction chamber;

a cylindrical shutter located inside said reaction chamber for selectively closing said passthrough opening, said cylindrical shutter being movable between a first position for closing said passthrough opening and a second position for opening said passthrough opening.

11. The reactor of claim 10, said cylindrical shutter being substantially hollow and including an internal cavity adapted to receive a cooling fluid.

12. The reactor as claimed in claim 11, further comprising tubing in fluid communication with said internal cavity for supplying said cooling fluid to said internal cavity.

13. The reactor as claimed in claim 10, further comprising a rotatable spindle having an upper end located inside said reaction chamber, wherein at least one of said wafer carriers is securable to the upper end of said spindle.

14. The reactor as claimed in claim 13, wherein at least one of said wafer carriers has an outer perimeter, and wherein said cylindrical shutter surrounds the outer perimeter of said at least one of said wafer carriers when said at least one of said wafer carriers is secured to said spindle.

15. The reactor as claimed in claim 12, wherein said reactor includes an injection flange for introducing reactants inside said reaction chamber and a base plate.

16. The reactor as claimed in claim 15, wherein said base plate has an opening for said tubing and said tubing extends through said tubing opening.

17. The reactor as claimed in claim 11, wherein said tubing has an upper end connected with said shutter.

18. The reactor as claimed in claim 17, wherein said tubing has a lower end located outside said reaction chamber and in fluid communication with a reservoir of said cooling fluid.

19. The reactor as claimed in claim 18, wherein said cooling fluid is a fluid selected from the group consisting of water, oil and liquids with a boiling temperature of about 100 degrees Celsius or greater.

20. The reactor as claimed in claim 18, wherein the lower end of said tubing is connected to a movable plate.

21. The reactor as claimed in claim 20, wherein said movable plate is connected to an actuator adapted for moving said shutter between the first position for opening said passthrough opening and the second position for closing said passthrough opening.

22. The reactor as claimed in claim 21, wherein said tubing moves simultaneously with said shutter between said first and second shutter positions.

23. The reactor as claimed in claim 21, further comprising a guide in communication with said movable plate for guiding movement of said movable plate between the first and second shutter positions.

24. The reactor as claimed in claim 10, wherein said reaction chamber is substantially cylindrical.

25. A shutter assembly for a reactor comprising:

a shutter for selectively closing a passthrough opening of said reactor, said shutter including an internal cavity adapted to receive a cooling fluid;

tubing connected with said shutter for supplying said cooling fluid to said internal cavity; and

an actuator connected with said tubing for moving said tubing and said shutter, wherein said shutter is movable between a first substantially closed position and a second substantially open position.

26. The shutter assembly as claimed in claim 25, wherein said tubing has an upper end secured to said shutter and a lower end in fluid communication with a source of the cooling fluid.

27. The shutter assembly as claimed in claim 25, further comprising a movable plate between said shutter and said actuator, wherein said tubing is permanently secured to said movable plate.

28. The shutter assembly as claimed in claim 27, wherein said tubing extends through an opening in said movable plate.

29. The shutter assembly as claimed in claim 28, further comprising a flexible bellows surrounding a portion of said tubing.

30. The shutter assembly as claimed in claim 25, wherein said shutter is cylindrical.

31. The shutter as claimed in claim 30, wherein said cylindrical shutter substantially surrounds an outer perimeter of a wafer carrier.

32. The shutter assembly as claimed in claim 25, wherein said cooling fluid is selected from the group consisting of gas, water, oil and liquids having a boiling temperature of 100 degrees Celsius or greater.